PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 482174 MSB/ghn	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/NZ2003/000149	International Filing Date *(day/month/year)* 11 July 2003	Priority Date *(day/month/year)* 11 July 2002

International Patent Classification (IPC) or national classification and IPC

Int. Cl. [7] G01R 33/20, 33/34

Applicant

VICTORIA LINK LIMITED et al

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

   [X] This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 7 sheet(s).

3. This report contains indications relating to the following items:

   - I [X] Basis of the report
   - II [ ] Priority
   - III [ ] Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV [ ] Lack of unity of invention
   - V [X] Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI [ ] Certain documents cited
   - VII [ ] Certain defects in the international application
   - VIII [ ] Certain observations on the international application

Date of submission of the demand 11 February 2004	Date of completion of the report 24 August 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer **MANISH RAJ** Telephone No. (02) 6283 2175

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/NZ2003/000149

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed.

☒ the description, pages **1 - 3, 5, 7 - 18,** as originally filed,
pages , filed with the demand,
pages **4, 6,** received on **29 July 2004** with the letter of **29 July 2004**

☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages **19 - 23,** received on **29 July 2004** with the letter of **29 July 2004**

☒ the drawings, pages **1/12 – 12/12,** as originally filed,
pages , filed with the demand,
pages , received on with the letter of

☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/NZ2003/000149

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1 - 27	YES
	Claims	NO
Inventive step (IS)	Claims 1 - 27	YES
	Claims -	NO
Industrial applicability (IA)	Claims 1 - 27	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

1. Claims 1-27 are novel and involve inventive step because no individual citation or obvious combination of citations teach or suggest "a magnetic assembly including a plurality of permanent magnets in an annular array about a longitudinal axis and which creates a zone of a homogenous magnetic field forward of the array", as claimed in the independent claims 1, 18, 19 and 25. By providing the annular array in the present invention, it is possible to achieve a uniform field at a greater depth or a stronger field at a shallower depth than can be achieved in other systems by changing the angle of the magnets and/or moving a central magnet for example.

2. Claims have been considered to have industrial applicability in the field of Nuclear Magnetic Resonance (NMR) spectroscopy.

OBJECT OF THE INVENTION

It is an object of the present invention to provide a magnetic assembly for an NMR apparatus, or an NMR apparatus, which overcomes or at least ameliorates some of the abovementioned disadvantages; or which at least provides the public with a useful choice.

Other objects of the invention may become apparent from the following description which is given by way of example only.

SUMMARY OF THE INVENTION

In accordance with a first aspect of the present invention, there is provided a magnetic assembly for an NMR apparatus, including a plurality of primary permanent magnets disposed in an annular array about an axis (hereafter "longitudinal axis"), the arrangement and/or characteristics of the plurality of magnets being such so as to create a zone of homogeneous magnetic field at some location along the axis forward of the array (and into the material when provided).

The assembly may include a secondary permanent magnet located along the longitudinal axis, at least partly within the array of primary magnets.

Advantageously, the position of the secondary permanent magnet is adjustable along the longitudinal axis relative to the primary magnets.

The secondary magnet may be a cylindrical bar magnet.

Preferably, each of the primary magnets has a north and a south pole with an axis extending therebetween, and the primary magnets are arranged such that their axes are oriented at a non-parallel angle to the longitudinal axis of the assembly. Each of the plurality of primary magnets may be a cylindrical bar magnet, each having a proximal end at a front of the array, and a distal end at a rear of the array.

Each of the plurality of primary magnets is preferably substantially identical. In the embodiment including a secondary permanent magnet located along the longitudinal axis, at least partly within the array of primary magnets, the secondary magnet is advantageously of substantially identical dimensions to each of the plurality of primary magnets. Each of the plurality of primary magnets and the secondary magnet may be a cylindrical bar magnet having a radius of about 1.8cm and a length of about 5cm.

The assembly preferably has eight primary magnets.

The nature of the magnets and their relationship to the axis and any intended sample and/or the remainder of the apparatus is preferably as substantially as herein described.

In accordance with a second aspect of the present invention, there is provided a nuclear magnetic resonance apparatus for one sided access investigations of a material, including a magnetic assembly according to the first aspect above.

The nuclear magnetic resonance apparatus is preferably portable.

The apparatus is advantageously operable to provide investigations into a sample at up to about 10cm.

The apparatus is preferably operable in such a fashion as to allow excitation of one volume V_a of the material, being one of a plurality of volumes V_1 to V_n existing as slices along the longitudinal axis. Preferably, the apparatus is operable to, following excitation of V_a then allow excitation of a second volume V_b being one of the plurality of volumes V_1 to V_n substantially immediately after excitation of V_a.

In accordance with a third aspect of the present invention, there is provided a nuclear magnetic resonance apparatus for one sided access investigations of a material, including a plurality of primary permanent magnets disposed in an annular array about an axis (hereafter